KRAMER ELECTRONICS LTD.

USER MANUAL

MODEL:

RTBUS-22
Round Table Connection Bus

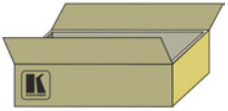
P/N: 2900-300100 Rev 1

RTBUS-22 Quick Start Guide

This page guides you through a basic installation and first-time use of your **RTBUS-22**. For more detailed information, see the **RTBUS-22** user manual. You can download the latest manual at http://www.kramerelectronics.com.

Step 1: Check what's in the box

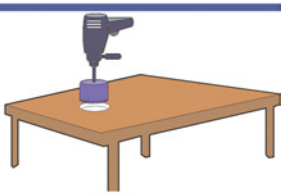
- **RTBUS-22** Round Table Connection Bus
- 2 table clamps
- 1 Quick start guide
- 1 User Manual



Save the original box and packaging materials in case your Kramer product needs to be returned to the factory for service.

Step 2: Cut an opening in the table

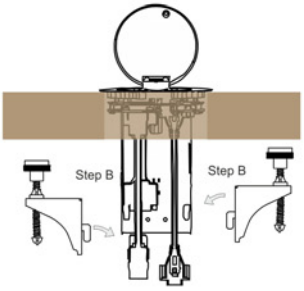
Drill an 110mm to 112mm (4.33in to 4.4in) hole in your table using a cup type drill bit.



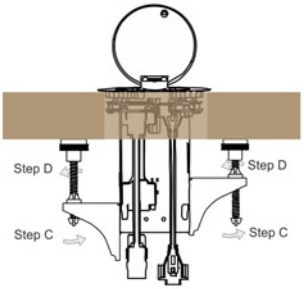
Step 3: Install the Connection BUS

A: Insert the Unit through the table opening.

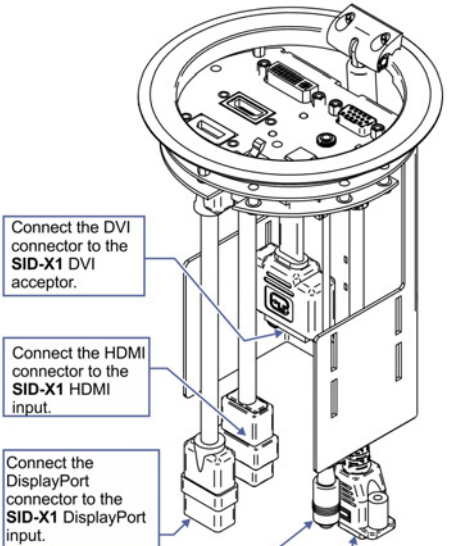
B: Insert the mounting brackets.



C, D: Secure the unit.



E: Connect the Cables.


Connect the DVI connector to the **SID-X1** DVI acceptor.
Connect the HDMI connector to the **SID-X1** HDMI input.
Connect the DisplayPort connector to the **SID-X1** DisplayPort input.
Connect the unbalanced stereo audio 3.5mm mini jack to the **SID-X1** AUDIO IN input.
Connect the VGA 15-pin HD connector to the **SID-X1** PC-UXGA input.

Contents

1	**Introduction**	**1**
2	**Getting Started**	**2**
2.1	Achieving the Best Performance	2
3	**Overview**	**3**
3.1	About HDCP—General Description	3
3.2	About DisplayPort—General Description	4
3.3	Digital Visual Interface—General Description	5
3.4	About HDMI—General Description	6
4	**Defining the RTBUS-22**	**7**
4.1	The RTBUS-22 Connecting Surface	8
5	**Installing the RTBUS-22**	**9**
5.1	Drilling a Hole in the Table	9
5.2	Mounting the RTBUS-22 in the Table	10
5.3	Connecting the Cables and Wires	11
6	**Using the RTBUS-22**	**13**
7	**Technical Specifications**	**14**

Figures

Figure 1: RTBUS-22 Top View 7
Figure 2: RTBUS-22 Connecting Surface 8
Figure 3: Connecting the Cables 11
Figure 4: RTBUS-22 to SID-X1 Cable Assembly 12
Figure 5: RTBUS-22 to SID-X1 Pinout 12
Figure 6: RTBUS-22 Boardroom Installation 13

1 Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront video, audio, presentation, and broadcasting professionals on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better!

Our 1,000-plus different models now appear in 11 groups that are clearly defined by function: GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Routers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters and GROUP 11: Sierra Video Products.

Thank you for purchasing the Kramer **RTBUS-22** Round Table Connection Bus, which is ideal for using with the Kramer **SID-X1** step-in commander in boardrooms, conference and training rooms!

For details on how to operate the **SID-X1** Step-in Commander, download the up-to-date Kramer user manual from the Internet at: http://www.kramerelectronics.com.

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high-performance high-resolution cables

Go to http://www.kramerelectronics.com to check for up-to-date user manuals, a complete list of Kramer wall plates and module connectors, application programs, and to check if firmware upgrades are available (where appropriate).

2.1 Achieving the Best Performance

To achieve the best performance:

- Use only good quality connection cables to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)
- Do not secure the cables in tight bundles or roll the slack into tight coils
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality
- Position your Kramer **RTBUS-22** away from moisture, excessive sunlight and dust

3 Overview

The **RTBUS-22** is an elegant furniture-mounted, round connection bus, designed to be used with the Kramer **SID-X1** *Step-In Commander*. The **RTBUS-22** features a pneumatic mechanism for pneumatic lifting and smooth closing of its lid. It is easily installed into a table or podium top, and its interface enables you to connect any equipment to systems installed in a room via the following pass-through connectors:

- 1 DVI connector
- 1 HDMI connector
- 1 DisplayPort Connector
- 1 UXGA on a 15-pin HD connector
- 1 stereo audio on a 3.5mm connector

The **RTBUS-22** also features INPUT SELECT and STEP IN buttons which can be connected to the terminal block connectors on the rear panel of the Kramer **SID-X1** *Step-In Commander* (see Section 5.3.1)

The **RTBUS-22** supports HDMI with Deep Color, x.v.Color™, Lip Sync, HDMI Uncompressed Audio Channels, Dolby TrueHD, DTS-HD, and CEC.

We offer the **RTBUS-22** in either a black anodized or a brushed clear aluminum surface.

3.1 About HDCP—General Description

The High-Bandwidth Digital Content Protection (HDCP) standard developed by Intel, protects digital video and audio signals transmitted over DVI or HDMI connections between two HDCP-enabled devices to eliminate the reproduction of copyrighted material. To protect copyright holders (such as movie studios) from having their programs copied and shared, the HDCP standard provides for the secure and encrypted transmission of digital signals.

3.2 About DisplayPort—General Description

DisplayPort (DP) is a digital display interface standard for the PC industry. It delivers the highest resolutions and sound quality.

In addition, DisplayPort:

- Provides a simple interface between a PC and a display, projector or TV
- Supports 1 to 4 data pairs ("lanes") at a transfer rate of either 1.6Gbps or 2.7Gbps (device dependent)
- Has a maximum length of 15m (49ft) for video transmission at a resolution of 1080p/60Hz and 3m (9.8ft) for full bandwidth transmission
- Video specs include a video path that supports 6 to 16 bits per color channel, a maximum resolution of 2560x1600 pixels and a total maximum bandwidth of 10.8Gbps over four lanes
- Is backward-compatible with HDMI, DVI (Digital Visual Interface) and VGA, via an appropriate adapter
- Version 1.1 supports HDCP
- Supports two-way communication over its auxiliary channel between the video source (for example, a PC) and the digital display, enabling new functionality such as automatic configuration and one-button play
- Replaces the interface needed between the PC and an external display, as well as the low voltage differential signaling (LVDS) interface in notebook computers, monitors, to connect to LCD panels

3.3 Digital Visual Interface—General Description

The Digital Visual Interface (DVI) is a video interface standard covering the transmission of video between a source device (such as a personal computer) and a display device. DVI is designed to carry uncompressed digital video data to a display. It is partially compatible with the HDMI (High-Definition Multimedia Interface) standard in digital mode (DVI-D), and VGA in analog mode (DVI-A).

A single-link DVI connection consists of four TMDS links; each link transmits data from the source to the device over 1 twisted wire pair. Three of the links correspond to the RGB components of the video signal: red, green, blue (for a total of 24 bits per pixel.) The fourth link carries the pixel clock. Each TMDS link carries binary data at ten times the pixel clock reference frequency, for a maximum data rate of 1.65Gbps × 3 data pairs for single-link DVI.

The DVI specification mandates a maximum pixel clock frequency of 165MHz when running in single-link mode. With a single DVI link, the highest supported standard resolution is 2.75 megapixels (including blanking interval) at 60Hz refresh. For practical purposes, this allows a maximum screen resolution at 60Hz of 1,915×1,436 pixels (standard 4:3 ratio), 1,854×1,483 pixels (5:4 ratio), or 2,098×1,311 (widescreen 16:10 ratio). A dual link doubles the number of TMDS pairs, effectively doubling video bandwidth at a given pixel clock frequency.

The maximum length of DVI cables is not included in the specification since it is dependent on the video resolution and refresh rate. In general, cable lengths up to 4.5m (15ft) will work for displays at resolutions of 1,920×1,200. This resolution will work even up to 10m (33ft) if appropriate cable is used. Cable lengths up to 15m (50ft) can be used with displays at resolutions up to 1,280×1,024. For longer distances, the use of a DVI booster is recommended to mitigate signal degradation. DVI boosters may use an external power supply.

3.4 About HDMI—General Description

High-Definition Multimedia Interface (HDMI) is an uncompressed all-digital audio/video interface, widely supported in the entertainment and home cinema industry. HDMI ensures an all-digital rendering of video without the losses associated with analog interfaces and their unnecessary digital-to-analog conversions. It delivers the maximum high-definition image and sound quality in use today. Note that Kramer Electronics Limited is an HDMI Adopter and an HDCP Licensee.

HDMI, the HDMI logo and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI licensing LLC.

In particular, HDMI:

- Provides a simple interface between any audio/video source, such as a set-top box, DVD player, or A/V receiver and video monitor, such as a digital flat LCD / plasma television (DTV), over a single lengthy cable

  SIMPLICITY - With video and multi-channel audio combined into a single cable, the cost, complexity, and confusion of multiple cables currently used in A/V systems is reduced

  LENGTHY CABLE - HDMI technology has been designed to use standard copper cable construction at up to 15m

- Supports standard, enhanced, high-definition video, and multi-channel digital audio on a single cable

  MULTI-CHANNEL DIGITAL AUDIO - HDMI supports multiple audio formats, from standard stereo to multi-channel surround-sound. HDMI has the capacity to support Dolby 5.1 audio and high-resolution audio formats

- Transmits all ATSC HDTV standards and supports 8-channel digital audio, with bandwidth to spare to accommodate future enhancements and requirements

- Benefits consumers by providing superior, uncompressed digital video quality via a single cable, and user-friendly connector

  HDMI provides the quality and functionality of a digital interface while also supporting uncompressed video formats in a simple, cost-effective manner

- Is backward-compatible with DVI (Digital Visual Interface)

- Supports CEC, two-way communication between the video source (such as a DVD player) and the digital television, enabling new functionality such as automatic configuration and one-button play

- Has the capacity to support existing high-definition video formats (720p, 1080i, and 1080p, 2K and 4K), standard definition formats such as NTSC or PAL, as well as 480p and 576p

4 Defining the RTBUS-22

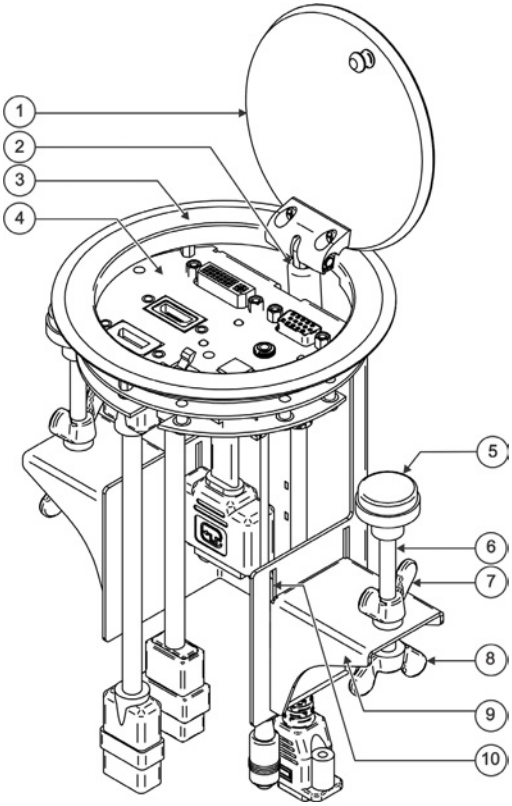


Figure 1: RTBUS-22 Top View

#	Feature	Function
1	Black anodized or brushed aluminum semi-automatic lid	Covers the connecting surface, leaving the table surface neat and tidy
2	Pneumatic Mechanism	Enables automatic lifting and smooth closing of the lid
3	Outer Rim	Fits over the table surface
4	Connecting Surface	See Figure 2
5	Rubber Protectors	Protect the table surface when mounting the unit (2)
6	Mounting Screws	For securing the **RTBUS-22** to the table(2)
7	Locking Butterfly Nuts	Tighten to lock the mounting butterfly screw (2)
8	Mounting Brackets (2 units)	Place in the bracket slits after inserting the enclosure into the table – for securing the unit to the table surface
9	Mounting Butterfly Nuts	Tighten to secure the unit to the table surface (2)
10	Mounting Bracket Slits (two sets on each side)	Insert the mounting brackets to the slits when installing the **RTBUS-22** (see Section 5.2).

4.1 The RTBUS-22 Connecting Surface

Figure 2 defines the connecting surface:

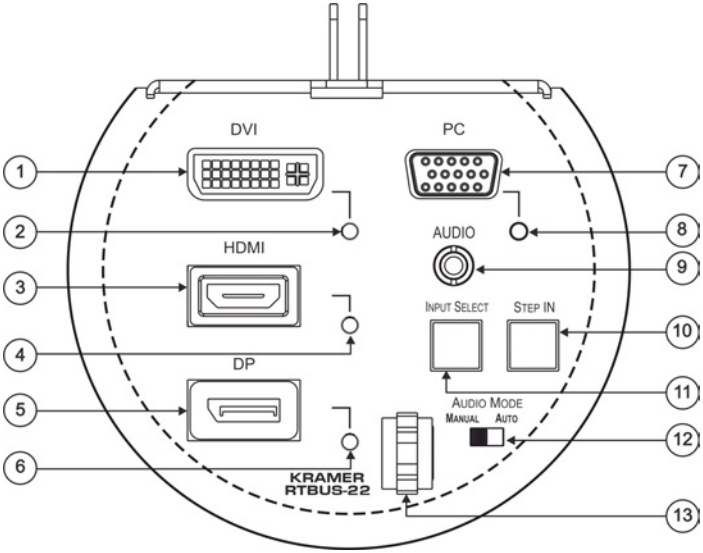


Figure 2: RTBUS-22 Connecting Surface

#	Feature	Function
1	*DVI* Connector	Connect to a DVI source
2	*DVI* LED	Lights green when the DVI input is selected
3	*HDMI* Connector	Connect to an HDMI source
4	*HDMI* LED	Lights green when the HDMI input is selected
5	*DP* Display Port connector	Connect to a DisplayPort source
6	DisplayPort LED	Lights green when the DisplayPort input is selected
7	*PC* 15-pin HD Connector	Connect to a UXGA source
8	PC LED	Lights green when the PC-UXGA input is selected
9	*AUDIO* 3.5mm Mini Jack	Connects to an unbalanced stereo audio source
10	STEP-IN Button	Connect to the remote terminal block of the Kramer **SID-X1**, and press to activate the input on the switcher that the **SID-X1** is connected to
11	*INPUT SELECT* Button (with LED)	Connect to the remote terminal block of the Kramer **SID-X1**, and press to cycle and select one of the inputs. The button LED flashes with each press of the button
12	AUDIO MODE MANUAL/AUTO Switch	N/A
13	Lid Latch	For safely closing the lid

5 Installing the RTBUS-22

To install the **RTBUS-22** perform the following steps:

1. Drill a hole in the table (see Section 5.1).
2. Insert the unit through the hole and secure the unit to the table (see Section 5.2).
3. Connect the cables (see Section 5.3).

5.1 Drilling a Hole in the Table

To drill an opening in the table:

1. Using any standard cup bit drill with a diameter ranging from 110 mm to 112 mm (4.33in to 4.4in), drill a hole in the table in the desired location.

The thickness of the table should be 3in (76mm) or less.

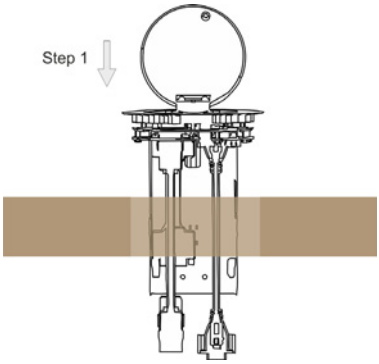
2. Clean the table surface.

Take care not to damage the table. Kramer Electronics is not responsible for any damage caused to the table.

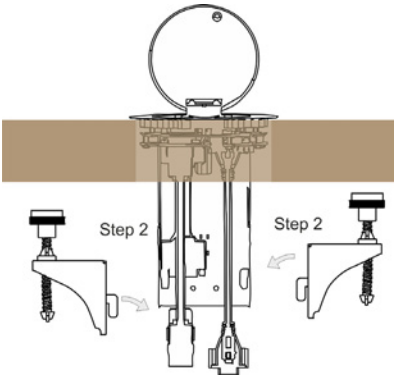
5.2 Mounting the RTBUS-22 in the Table

To mount the unit, follow these steps:

Step 1: Insert the **RTBUS-22** into the hole cut into the table making sure the outer rim is firm against the surface of the table.

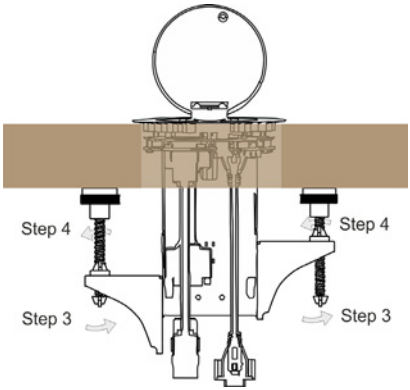


Step 2: From underneath the table, slide the mounting brackets into the appropriate slots.



Step 3: Tighten the butterfly mounting screws securely upward against the table.

Step 4: Lock the mounting screws into position with the locking butterfly screws.



5.3 Connecting the Cables and Wires

Figure 3 illustrates how to connect the cables to the underside of the unit:

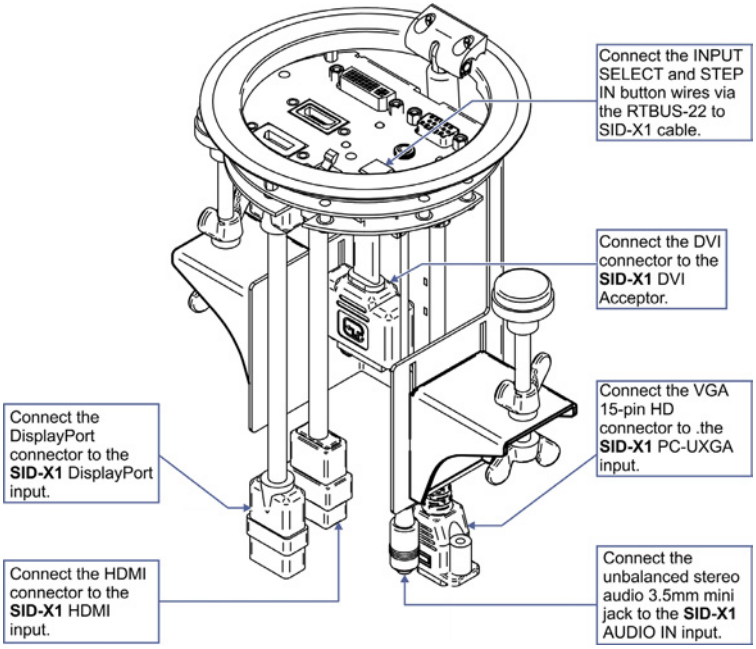

Connect the INPUT SELECT and STEP IN button wires via the RTBUS-22 to SID-X1 cable.
Connect the DVI connector to the **SID-X1** DVI Acceptor.
Connect the VGA 15-pin HD connector to .the **SID-X1** PC-UXGA input.
Connect the unbalanced stereo audio 3.5mm mini jack to the **SID-X1** AUDIO IN input.
Connect the DisplayPort connector to the **SID-X1** DisplayPort input.
Connect the HDMI connector to the **SID-X1** HDMI input.

Figure 3: Connecting the Cables

Note that the cables shown in Figure 3 are 50cm long and have a MALE connector at the free end so they can be plugged directly into the **SDI-X1**. You can extend these cables if required.
Note that the connecting surface is an integral part of the **RTBUS-22** enclosure and cannot be detached.

5.3.1 Connecting the INPUT SELECTOR Button

The **RTBUS-22** INPUT SELECT and STEP IN buttons connect (from underneath the connecting surface) to the remote terminal block connectors of the **SID-X1** via the **RTBUS-12/22** to **SID-X1** cable assembly, provided with the **RTBUS-22**, see Figure 4:

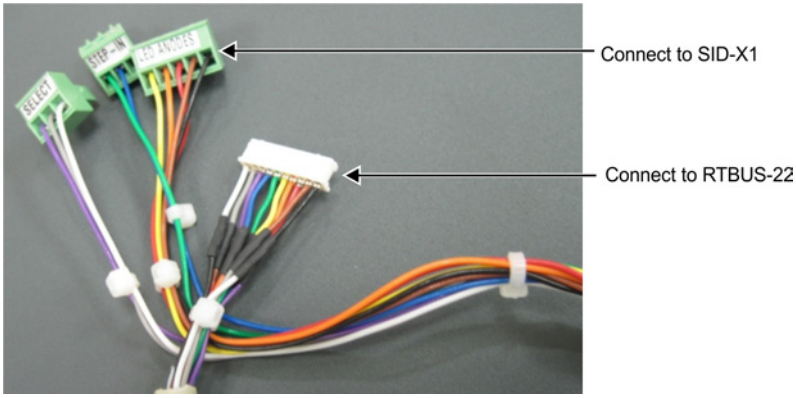


Figure 4: RTBUS-22 to SID-X1 Cable Assembly

Figure 5 shows the connection pinout:

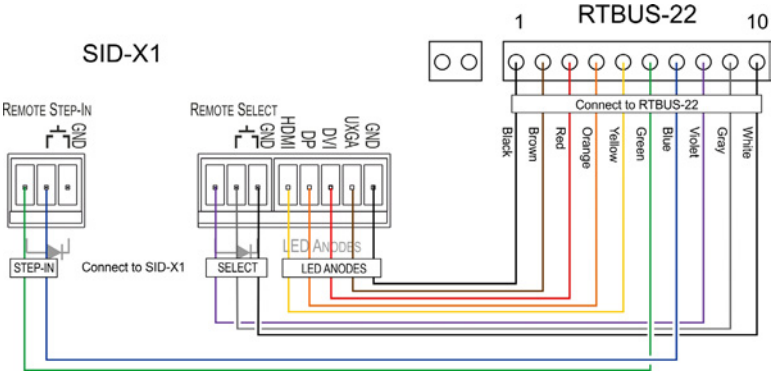


Figure 5: RTBUS-22 to SID-X1 Pinout

6 Using the RTBUS-22

Once the **RTBUS-22** is installed, you can easily customize it to your own needs by directly plugging in the required AV equipment.

When connecting the **RTBUS-22** together with the **SID-X1**, as illustrated in the example in Figure 6, you can select the input to switch to the remote switcher (for example to the Kramer **VP-81SID**).

In this example, the connecting surface is connected to a laptop, a DVD player and a computer graphics source via the DP, HDMI and UXGA connectors, respectively. A memory stick is connected to the USB connector and the laptop has Internet access via the Ethernet connector.

From underneath the table, the DVI, DP and UXGA cables are connected to the **SID-X1** inputs and the INPUT SELECT button is wired to the REMOTE SELECT terminal block connectors on the **SID-X1** rear panel.

Press the INPUT SELECT button on the connecting surface to cycle between inputs and select the input on the **SID-X1**.

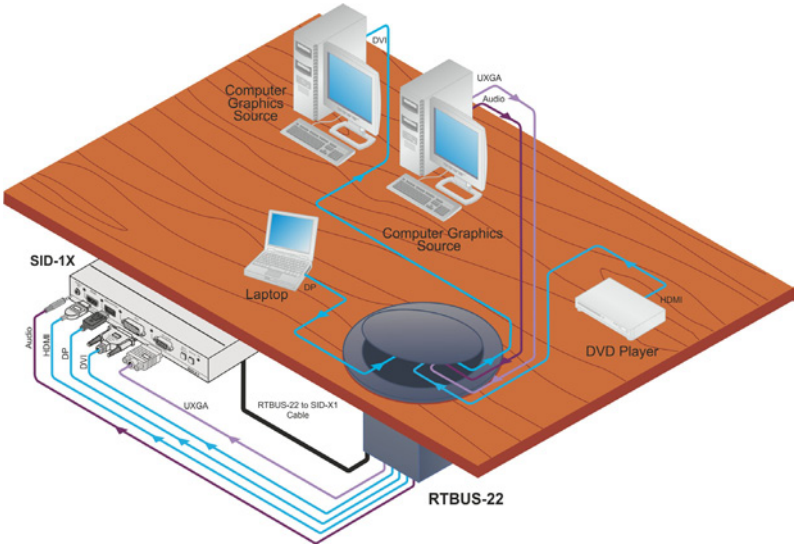


Figure 6: RTBUS-22 Boardroom Installation

7 Technical Specifications

PORTS:	1 HDMI connector, 1 DVI connector, 1 DisplayPort connector, 1 15-pin HD connector, 1 3.5mm mini jack
OPERATING TEMPERATURE RANGE:	+5 to +45 Deg. Centigrade
OPERATING HUMIDITY RANGE:	10 to 90% RHL, non-condensing
STORAGE TEMPERATURE RANGE:	-20 to +70Deg. C.
STORAGE HUMIDITY RANGE:	5 to 95% RHL, non-condensing
DIMENSIONS:	12.8cm x 16.5cm (5.0" x 6.5") Diameter, H
WEIGHT:	0.8kg (1.76lbs) approx. 1.0kg (2.6lbs) approx. with mounting brackets
Specifications are subject to change without notice at http://www.kramerelectronics.com	

LIMITED WARRANTY

The warranty obligations of Kramer Electronics for this product are limited to the terms set forth below:

What is Covered

This limited warranty covers defects in materials and workmanship in this product.

What is Not Covered

This limited warranty does not cover any damage, deterioration or malfunction resulting from any alteration, modification, improper or unreasonable use or maintenance, misuse, abuse, accident, neglect, exposure to excess moisture, fire, improper packing and shipping (such claims must be presented to the carrier), lightning, power surges, or other acts of nature. This limited warranty does not cover any damage, deterioration or malfunction resulting from the installation or removal of this product from any installation, any unauthorized tampering with this product, any repairs attempted by anyone unauthorized by Kramer Electronics to make such repairs, or any other cause which does not relate directly to a defect in materials and/or workmanship of this product. This limited warranty does not cover cartons, equipment enclosures, cables or accessories used in conjunction with this product.

Without limiting any other exclusion herein, Kramer Electronics does not warrant that the product covered hereby, including, without limitation, the technology and/or integrated circuit(s) included in the product, will not become obsolete or that such items are or will remain compatible with any other product or technology with which the product may be used.

How Long Does this Coverage Last

Seven years as of this printing; please check our Web site for the most current and accurate warranty information.

Who is Covered

Only the original purchaser of this product is covered under this limited warranty. This limited warranty is not transferable to subsequent purchasers or owners of this product.

What Kramer Electronics will do

Kramer Electronics will, at its sole option, provide one of the following three remedies to whatever extent it shall deem necessary to satisfy a proper claim under this limited warranty:

1. Elect to repair or facilitate the repair of any defective parts within a reasonable period of time, free of any charge for the necessary parts and labor to complete the repair and restore this product to its proper operating condition. Kramer Electronics will also pay the shipping costs necessary to return this product once the repair is complete.
2. Replace this product with a direct replacement or with a similar product deemed by Kramer Electronics to perform substantially the same function as the original product.
3. Issue a refund of the original purchase price less depreciation to be determined based on the age of the product at the time remedy is sought under this limited warranty.

What Kramer Electronics will not do Under This Limited Warranty

If this product is returned to Kramer Electronics or the authorized dealer from which it was purchased or any other party authorized to repair Kramer Electronics products, this product must be insured during shipment, with the insurance and shipping charges prepaid by you. If this product is returned uninsured, you assume all risks of loss or damage during shipment. Kramer Electronics will not be responsible for any costs related to the removal or re-installation of this product from or into any installation. Kramer Electronics will not be responsible for any costs related to any setting up this product, any adjustment of user controls or any programming required for a specific installation of this product.

How to Obtain a Remedy under this Limited Warranty

To obtain a remedy under this limited warranty, you must contact either the authorized Kramer Electronics reseller from whom you purchased this product or the Kramer Electronics office nearest you. For a list of authorized Kramer Electronics resellers and/or Kramer Electronics authorized service providers, please visit our web site at www.kramerelectronics.com or contact the Kramer Electronics office nearest you.

In order to pursue any remedy under this limited warranty, you must possess an original, dated receipt as proof of purchase from an authorized Kramer Electronics reseller. If this product is returned under this limited warranty, a return authorization number, obtained from Kramer Electronics, will be required. You may also be directed to an authorized reseller or a person authorized by Kramer Electronics to repair the product.

If it is decided that this product should be returned directly to Kramer Electronics, this product should be properly packed, preferably in the original carton, for shipping. Cartons not bearing a return authorization number will be refused.

Limitation on Liability

THE MAXIMUM LIABILITY OF KRAMER ELECTRONICS UNDER THIS LIMITED WARRANTY SHALL NOT EXCEED THE ACTUAL PURCHASE PRICE PAID FOR THE PRODUCT. TO THE MAXIMUM EXTENT PERMITTED BY LAW, KRAMER ELECTRONICS IS NOT RESPONSIBLE FOR DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, OR UNDER ANY OTHER LEGAL THEORY. Some countries, districts or states do not allow the exclusion or limitation of relief, special, incidental, consequential or indirect damages, or the limitation of liability to specified amounts, so the above limitations or exclusions may not apply to you.

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IF ANY PRODUCT TO WHICH THIS LIMITED WARRANTY APPLIES IS A “CONSUMER PRODUCT” UNDER THE MAGNUSON-MOSS WARRANTY ACT (15 U.S.C.A. §2301, ET SEQ.) OR OTHER APPICABLE LAW, THE FOREGOING DISCLAIMER OF IMPLIED WARRANTIES SHALL NOT APPLY TO YOU, AND ALL IMPLIED WARRANTIES ON THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR THE PARTICULAR PURPOSE, SHALL APPLY AS PROVIDED UNDER APPLICABLE LAW.

Other Conditions

This limited warranty gives you specific legal rights, and you may have other rights which vary from country to country or state to state.

This limited warranty is void if (i) the label bearing the serial number of this product has been removed or defaced, (ii) the product is not distributed by Kramer Electronics or (iii) this product is not purchased from an authorized Kramer Electronics reseller. If you are unsure whether a reseller is an authorized Kramer Electronics reseller, please visit our Web site at www.kramerelectronics.com or contact a Kramer Electronics office from the list at the end of this document.

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SAFETY WARNING
Disconnect the unit from the power supply before opening and servicing

P/N: 2900-300100 Rev: 1